Name:

at1124exam: Radicals and Squares (v903)

Question 1

Simplify the radical expressions.

$\sqrt{28}$	$\sqrt{8}$	$\sqrt{63}$
$\sqrt{2 \cdot 2 \cdot 7}$	$\sqrt{2 \cdot 2 \cdot 2}$	$\sqrt{3 \cdot 3 \cdot 7}$
$2\sqrt{7}$	$2\sqrt{2}$	$3\sqrt{7}$

Question 2

Find all solutions to the equation below:

$$2\left((x-4)^2+3\right) \;=\; 56$$

First, divide both sides by 2.

$$(x-4)^2+3=28$$

Then, subtract 3 from both sides.

$$(x-4)^2=25$$

Undo the squaring. Remember the plus-minus symbol.

$$x-4=\pm 5$$

Add 4 to both sides.

$$x=4\pm 5$$

So the two solutions are $x=9$ and $x=-1$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 14x = 95$$

$$x^2 - 14x + 49 = 95 + 49$$
$$x^2 - 14x + 49 = 144$$
$$(x - 7)^2 = 144$$
$$x - 7 = \pm 12$$
$$x = 7 \pm 12$$
$$x = 19 \quad \text{or} \quad x = -5$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x - h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 2x^2 + 24x + 75$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 12x) + 75$$

We want a perfect square. Halve 12 and square the result to get 36 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 12x + 36 - 36) + 75$$

Factor the perfect-square trinomial.

$$y = 2((x + 6)^2 - 36) + 75$$

Distribute the 2.

$$y = 2(x + 6)^2 - 72 + 75$$

Combine the constants to get **vertex form**:

$$y = 2(x + 6)^2 + 3$$

The vertex is at point $(-6, 3)$.